

High Quality Math Editing & Display in Office 12

Murray Sargent III
Office Authoring Services

Overview

- 8 math infrastructures inside and outside of Microsoft enable better math display/editing
- New math edit/display environment
- Provide infrastructure for editing programs to support built-up formulas
- Provide ability to interchange formulae with popular mathematics programs such as Mathematica, MathCad and Matlab
- Incorporate into Word 12, OneNote 2.0, RichEdit, PowerPoint, IE, ...

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- Incorporate into Word 12, OneNote 2.0, RichEdit, PowerPoint, IE, ...

Collaborators

- Math layout handler: Eliyezer Kohen, Victor Kozyrev, Andrei Burago
- Word PM: Jennifer Michelstein
- New font: Mike Duggan, Geraldine Wade, Greg Hitchcock and Monotype
- OpenType: Sergei Malkin
- Devs/Test/PM of RichEdit, LineServices, Page/TableServices, Word, OneNote, Office Art
- Hand writing: MSR & MSRA
- Outside: Barbara Beeton, Asmus Freytag

Math Infrastructures

- [La]TeX: current tech-doc standards
- Unicode 4.0: includes ~2000 math symbols
- MathML 2.0: math K – 12 and beyond
- OpenType: special math tables
- New OpenType math font
- LineServices 4.0: math handler
- RichEdit 6.0: multilingual math edit engine
- MS Office environment, autocorrect

[La]TeX

- Widely used, high quality tech document preparation system
- Simple ASCII keyboard entry
- Usage and math typography are well documented
- Stable since 1986
- Complex scenarios are hard to manipulate
- Numerous dialects and macros complicate interchange

Unicode 4.0

- 340 math chars exist in ASCII, U+2200 block, arrows, combining marks
- 1016 math alphanumeric characters are in Unicode Plane 1 or Letterlike Symbols
- 591 new math symbols and operators are on BMP
- One math variant selector
- One new combining character (reverse solidus)
- New math characters were requested by STIX

Extensive Math Symbols

	298	299	29A	29B	29C	29D	29E	29F
0	 2980	 2990	 29A0	 29B0	 29C0	 29D0	 29E0	 29F0
1	 2981	 2991	 29A1	 29B1	 29C1	 29D1	 29E1	 29F1
2	 2982	 2992	 29A2	 29B2	 29C2	 29D2	 29E2	 29F2
3	 2983	 2993	 29A3	 29B3	 29C3	 29D3	 29E3	 29F3
4	 2984	 2994	 29A4	 29B4	 29C4	 29D4	 29E4	 29F4

Basic Set of Alphanumeric Characters

- Latin digits (0 - 9)
- Upper- & lowercase Latin letters (a - z, A - Z)
- Uppercase Greek letters Λ - Ω plus the nabla ∇ and the variant of theta Θ given by U+03F4
- Lowercase Greek letters α - ω plus the partial differential sign ∂ and glyph variants of ε , θ , κ , φ , ρ , and π
- Only unaccented forms of letters are used

Math. Applications: Overview

Mathematical applications are a central part of the curriculum. They provide a context for learning mathematical concepts and skills. The applications are designed to be relevant to students' lives and to help them understand the importance of mathematics in the real world. The applications are organized into several categories, including geometry, algebra, and calculus.

Geometry

Geometry is the study of shapes and their properties. It is a branch of mathematics that deals with the measurement and properties of shapes. Geometry is used in many fields, including architecture, engineering, and art. The applications in this section focus on the properties of shapes and how they are used in the real world. The applications include:
- The properties of triangles and quadrilaterals.
- The properties of circles and spheres.
- The properties of polygons and polyhedra.

Algebra

Algebra is the study of mathematical symbols and the rules for manipulating them. It is a branch of mathematics that deals with the properties of numbers and the relationships between them. The applications in this section focus on the properties of numbers and how they are used in the real world. The applications include:
- The properties of numbers and the rules for manipulating them.
- The properties of equations and inequalities.

Unitec and Market

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1993	100	100
1994	100	100
1995	100	100
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2099	100	100
2100	100	100

MathML For a Better Web

MathML (the Markup Language for Web Equations) is an educational, scientific and technical markup language that has the potential to make mathematics accessible to those with visual disabilities. It will allow mathematical content to be stored and exchanged with technical computing systems, other visualization systems, and other systems.

© 1998 by the American Mathematical Society

MathML

MathML (1998-1999) was the first
World Wide Web Consortium (W3C)
endorsed XML vocabulary

for mathematical description
with a focus on a subset of the content
mathematical notation

MathML defines the way in which
mathematical notation is written

MathML 1.0
1998

MathML 2.0
2003

MathML 3.0
2010

MathML 4.0
2019

MathML Presentation Markup

MathML is a language for describing mathematical notation and content. It is designed to be a standard for representing mathematical documents in a way that is both human-readable and machine-processable.

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Main Content



OpenType



Open Type Properties for Wave Equations

$V_- \longleftarrow$ no Open Type

$V_+ \longleftarrow$ Open Type

New Method Form

1. The first step in the process is to identify the problem or goal. This involves a thorough analysis of the current situation and a clear definition of the desired outcome. Once the problem is identified, the next step is to develop a plan of action. This plan should outline the steps that need to be taken to achieve the goal, and it should be flexible enough to allow for changes as more information is gathered. The third step is to implement the plan. This involves putting the plan into action and monitoring progress. If the plan is not working, it may be necessary to make adjustments. The final step is to evaluate the results. This involves comparing the actual results with the desired outcome and determining whether the goal has been achieved. If not, the process may need to be repeated.

2. The second step in the process is to gather information. This involves collecting data and facts that are relevant to the problem. This information can be gathered through a variety of methods, including interviews, surveys, and research. Once the information is gathered, it should be analyzed to identify patterns and trends. This analysis can help to determine the causes of the problem and to develop a plan of action.

3. The third step in the process is to develop a plan of action. This involves identifying the steps that need to be taken to achieve the goal. The plan should be realistic and achievable, and it should be flexible enough to allow for changes as more information is gathered. The plan should also be communicated to all relevant parties, so that they are all aware of the goal and the steps that need to be taken.

LINE SEAR (v. 1.0)

Standard line layout component for the
Illustrator Microsoft text engine

New fonts handled developed by Ellyza
Kotova, Victor Kozlov, Andrei Buzga

Supports the Paper Table format of
variable optimization breaking algorithm

1.0.0.0 3.0.0.0 1.0.0.0 1.0.0.0

1.0.0.0 1.0.0.0 1.0.0.0 1.0.0.0

Rich Edition

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the success of any business or organization. The text outlines various methods for collecting and organizing data, including the use of spreadsheets and databases. It also highlights the need for regular audits to ensure the integrity of the information.

2. The second part of the document focuses on the role of technology in modern business operations. It explores how digital tools and platforms can streamline processes, improve communication, and enhance productivity. The text provides examples of successful implementations of technology in various industries, such as e-commerce and digital marketing. It also discusses the challenges associated with adopting new technologies and offers strategies to overcome them.

3. The third part of the document addresses the importance of financial management and budgeting. It explains how a well-defined budget can help organizations allocate resources effectively and track their financial performance. The text provides practical advice on how to create a budget, monitor expenses, and make adjustments as needed. It also discusses the role of financial reporting in providing transparency and accountability to stakeholders.

4. The fourth part of the document discusses the importance of human resources management. It emphasizes that a strong workforce is the foundation of any successful organization. The text outlines key strategies for recruiting, training, and retaining top talent. It also discusses the importance of fostering a positive work environment and promoting employee engagement. The text provides examples of best practices in HR management and offers tips for implementing them in your organization.

5. The fifth part of the document discusses the importance of marketing and sales. It explains how a well-executed marketing strategy can help organizations reach their target audience and drive sales growth. The text outlines various marketing channels and tactics, including social media, email marketing, and content marketing. It also discusses the importance of sales training and the role of sales in the overall business strategy. The text provides examples of successful marketing and sales campaigns and offers tips for creating a winning strategy.

Chiffre-méthode

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Sommerblätter Reimrezepte



General Linear Regression

Model: $y = \beta_0 + \beta_1 x + \epsilon$

Assumptions:

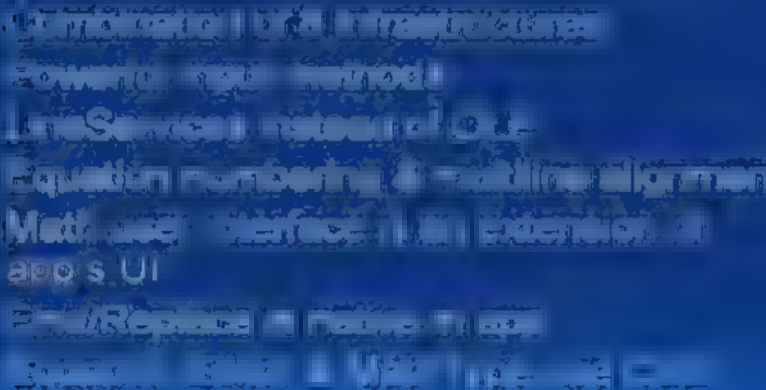
- 1. Linearity: The relationship between x and y is linear.
- 2. Independence: The observations are independent of each other.
- 3. Homoscedasticity: The variance of the error term ϵ is constant across all values of x .
- 4. Normality: The error term ϵ follows a normal distribution.

Estimation: The parameters β_0 and β_1 are estimated using the method of least squares, which minimizes the sum of the squared residuals.

Other Components Used

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Main Display/Editing Model



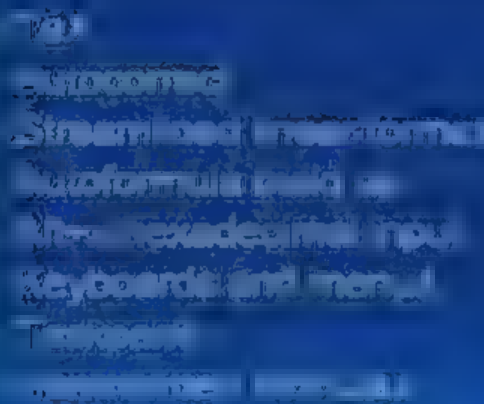
Resistance

Majority of individuals in the world are not willing to give up their freedom for security. This is a natural human capability.

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Input Methods





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THE

Minireport W~~2~~ Example

1. W~~2~~ Example

2. W~~2~~ Example

3. W~~2~~ Example

4. W~~2~~ Example

5. W~~2~~ Example

1. W~~2~~ Example

2. W~~2~~ Example

3. W~~2~~ Example

4. W~~2~~ Example

5. W~~2~~ Example

Symbol Entry

Symbol Entry is a feature that allows you to enter symbols and characters that are not available on the standard keyboard. This is useful for entering mathematical symbols, special characters, and characters from other languages. To use Symbol Entry, press the **Symbol** key (the key with a small icon of a symbol) on the keyboard. This will open the Symbol Entry menu, which displays a list of symbols and characters. You can scroll through the list to find the symbol you want to enter, or you can type the first few letters of the symbol to search for it. Once you have found the symbol, press the **Enter** key to insert it into the text. The Symbol Entry menu also includes a search bar at the top, which allows you to search for a specific symbol or character. To use the search bar, type the symbol or character you are looking for into the search bar, and then press the **Enter** key. The menu will then display only the symbols and characters that match your search criteria.

Symbol Entry is a powerful tool that can help you enter symbols and characters that are not available on the standard keyboard. It is easy to use and can be used to enter a wide variety of symbols and characters. If you are looking for a way to enter symbols and characters that are not available on the standard keyboard, Symbol Entry is the way to go.

Herz, Lieder, Jugend (Meine)

Handwritten musical score for the song "Herz, Lieder, Jugend (Meine)". The score is written on ten staves, with the first nine staves containing the main melody and the tenth staff containing a separate line of music. The notation includes various musical symbols such as notes, rests, and bar lines. The handwriting is in German, and the score is written in ink on aged paper.

The first staff begins with a treble clef and a key signature of one flat (B-flat). The melody is written in a simple, folk-like style. The lyrics are written below the notes, and the score is divided into measures by vertical bar lines. The handwriting is clear and legible, and the overall appearance is that of a personal or working manuscript.

Formulas And Equations

A page of handwritten musical notation on a five-line staff. The notation is in a cursive, historical style, likely from a 17th or 18th-century manuscript. It includes various note values, rests, and bar lines. The ink is dark, and the paper shows signs of age and wear.

Linear Transformation

Transformation maps V to V or V to W .
Example: $T: \mathbb{R}^2 \rightarrow \mathbb{R}^2$ defined by $T(x, y) = (2x, 3y)$

Linear Transformation: $T: V \rightarrow W$ is linear if
 $T(ax + by) = aT(x) + bT(y)$
for all $x, y \in V$ and $a, b \in \mathbb{R}$.

character

Linear Transformation

Linear Transformation: $T: V \rightarrow W$ is linear if
 $T(ax + by) = aT(x) + bT(y)$
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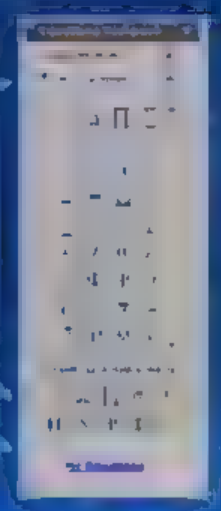
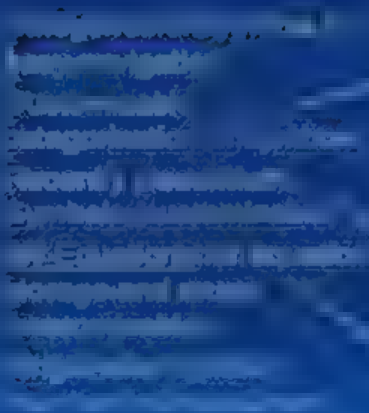
Linear Transformation: $T: V \rightarrow W$ is linear if
 $T(ax + by) = aT(x) + bT(y)$
for all $x, y \in V$ and $a, b \in \mathbb{R}$.

form

Einzelne Fortschrittstafeln (Fortsch.)



Taskpane



Handwritten Equations

$$\frac{d}{dt} \left(\frac{1}{2} m v^2 \right) = \frac{d}{dt} \left(\frac{1}{2} m \frac{dx}{dt} \frac{dx}{dt} \right) = m \frac{dx}{dt} \frac{d^2x}{dt^2} = m v \frac{d^2x}{dt^2}$$

$$\frac{d}{dt} \left(\frac{1}{2} m v^2 \right) = \frac{d}{dt} \left(\frac{1}{2} m \frac{dx}{dt} \frac{dx}{dt} \right) = m \frac{dx}{dt} \frac{d^2x}{dt^2} = m v \frac{d^2x}{dt^2}$$

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$$\frac{d}{dt} \left(\frac{1}{2} m v^2 \right) = \frac{d}{dt} \left(\frac{1}{2} m \frac{dx}{dt} \frac{dx}{dt} \right) = m \frac{dx}{dt} \frac{d^2x}{dt^2} = m v \frac{d^2x}{dt^2}$$

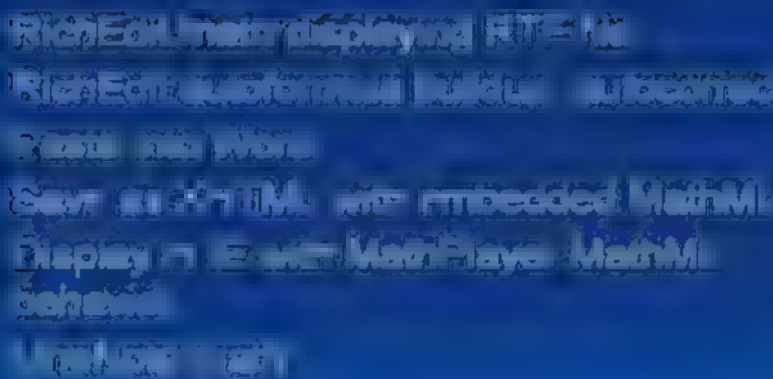
1. **Identify the main idea** of the passage. What is the author's primary purpose in writing this text?

[View all posts by](#) [David J. Reardon](#)

For a more complete discussion of the various methods of determining the value of the various components of the cost of capital, see the following references:

1990

Demo

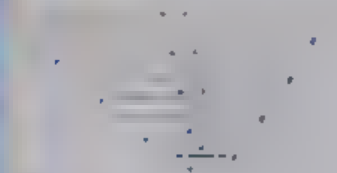


Where else?



Chapter 1: The Real Number System

1.1 The Real Number System



1.2 The Real Number System

1.3 The Real Number System

1.4 The Real Number System

1.5 The Real Number System

1.6 The Real Number System

1.7 The Real Number System

1.8 The Real Number System

1.9 The Real Number System

1.10 The Real Number System

1.11 The Real Number System

1.12 The Real Number System

Chapter 1

Section 1.1

Example 1.1

Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be defined by

$$f(x) = \begin{cases} x^2 & \text{if } x \geq 0 \\ 0 & \text{if } x < 0 \end{cases}$$

Prove that f is differentiable at $x = 0$.

Solution:

Let $h \in \mathbb{R}$ be arbitrary. Then

$$f(0+h) - f(0) = \begin{cases} h^2 & \text{if } h \geq 0 \\ 0 & \text{if } h < 0 \end{cases}$$

and

$$h = |h|$$

Therefore

$$\frac{f(0+h) - f(0)}{h} = \begin{cases} h & \text{if } h \geq 0 \\ 0 & \text{if } h < 0 \end{cases}$$

which tends to 0 as $h \rightarrow 0$. Hence f is differentiable at $x = 0$ with derivative $f'(0) = 0$.

□

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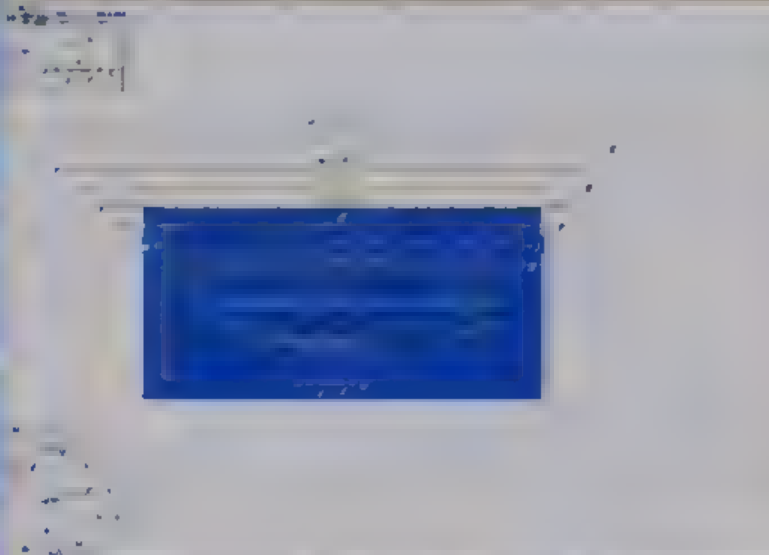
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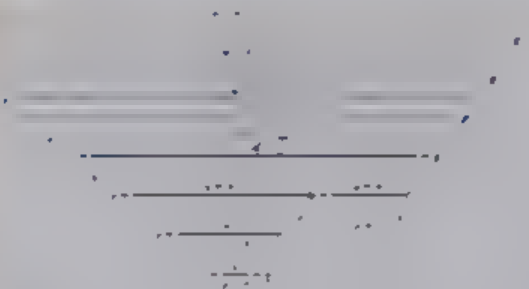
□

□



Problem Solving

$$\frac{1}{2} \times \frac{3}{4} = \frac{3}{8}$$



Problem Solving

Microsoft Office Word 2003 interface showing a blank document with a menu bar and a toolbar.

Working - started



Office Online

Working - started

Working - started

Working - started

Working - started

Working - started

Working - started

Working - started

Working - started

Microsoft Office Word 2003 interface showing a blank document with a menu bar and a toolbar.

Working on...



Office Order

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Learning Objectives



Office Order

1. The first step in the process is to identify the problem or opportunity for improvement. This involves gathering data and understanding the current state of the process.

2. The second step is to analyze the data and identify the root cause of the problem. This can be done using various tools such as fishbone diagrams or 5 Whys.

3. The third step is to develop a solution and implement it. This involves creating a plan, executing it, and monitoring the results to ensure that the problem is solved.

Example:

1. The first step in the process is to identify the problem or opportunity for improvement. This involves gathering data and understanding the current state of the process.

2. The second step is to analyze the data and identify the root cause of the problem. This can be done using various tools such as fishbone diagrams or 5 Whys.

3. The third step is to develop a solution and implement it. This involves creating a plan, executing it, and monitoring the results to ensure that the problem is solved.

4. The fourth step is to evaluate the results and determine if the problem has been solved. This involves comparing the results to the original problem and determining if the solution is effective.

5. The fifth step is to standardize the solution and ensure that it is implemented consistently. This involves creating a standard operating procedure and training employees on the new process.

6. The sixth step is to monitor the results and make adjustments as needed. This involves continuing to gather data and analyze the results to ensure that the problem is solved and the process is improved.

7. The seventh step is to communicate the results and share the success with the team. This involves creating a report and presenting it to the team and management.

8. The eighth step is to celebrate the success and recognize the team's efforts. This involves creating a reward system and recognizing the team's achievements.

9. The ninth step is to review the process and make improvements. This involves creating a feedback loop and continuously improving the process.

10. The tenth step is to document the process and ensure that it is accessible to all employees. This involves creating a manual and ensuring that it is up-to-date.

11. The eleventh step is to train new employees on the process. This involves creating a training program and ensuring that all new employees are trained on the process.

12. The twelfth step is to monitor the results and make adjustments as needed. This involves continuing to gather data and analyze the results to ensure that the problem is solved and the process is improved.

13. The thirteenth step is to communicate the results and share the success with the team. This involves creating a report and presenting it to the team and management.

14. The fourteenth step is to celebrate the success and recognize the team's efforts. This involves creating a reward system and recognizing the team's achievements.

15. The fifteenth step is to review the process and make improvements. This involves creating a feedback loop and continuously improving the process.

$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

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Summary view



Office Order

Form fields for Office Order, including a date field and a text area.

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Search input field with a magnifying glass icon.

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Learning Objectives



Office Order

1. The first step in the process is to identify the problem or opportunity that has led to the need for a new office order.

2. The second step is to gather information about the current office order and the needs of the organization.

3. The third step is to develop a plan for the new office order, taking into account the needs of the organization and the resources available.

4. The fourth step is to implement the plan, making sure that all necessary resources are in place and that the new office order is being followed.

5. The fifth step is to evaluate the results of the new office order, making sure that it is meeting the needs of the organization and that it is being followed.

6. The sixth step is to make any necessary adjustments to the new office order, making sure that it is still meeting the needs of the organization and that it is being followed.

7. The seventh step is to communicate the results of the new office order to all relevant parties, making sure that they understand the benefits and the importance of the new office order.

8. The eighth step is to monitor the results of the new office order, making sure that it is still meeting the needs of the organization and that it is being followed.

9. The ninth step is to make any necessary adjustments to the new office order, making sure that it is still meeting the needs of the organization and that it is being followed.

10. The tenth step is to communicate the results of the new office order to all relevant parties, making sure that they understand the benefits and the importance of the new office order.

11. The eleventh step is to monitor the results of the new office order, making sure that it is still meeting the needs of the organization and that it is being followed.

12. The twelfth step is to make any necessary adjustments to the new office order, making sure that it is still meeting the needs of the organization and that it is being followed.

13. The thirteenth step is to communicate the results of the new office order to all relevant parties, making sure that they understand the benefits and the importance of the new office order.

14. The fourteenth step is to monitor the results of the new office order, making sure that it is still meeting the needs of the organization and that it is being followed.

15. The fifteenth step is to make any necessary adjustments to the new office order, making sure that it is still meeting the needs of the organization and that it is being followed.

16. The sixteenth step is to communicate the results of the new office order to all relevant parties, making sure that they understand the benefits and the importance of the new office order.

17. The seventeenth step is to monitor the results of the new office order, making sure that it is still meeting the needs of the organization and that it is being followed.

18. The eighteenth step is to make any necessary adjustments to the new office order, making sure that it is still meeting the needs of the organization and that it is being followed.

19. The nineteenth step is to communicate the results of the new office order to all relevant parties, making sure that they understand the benefits and the importance of the new office order.

20. The twentieth step is to monitor the results of the new office order, making sure that it is still meeting the needs of the organization and that it is being followed.

Learning Objectives



Office Online

Home

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Figure 1

$$\frac{1}{x^2} = x^{-2}$$

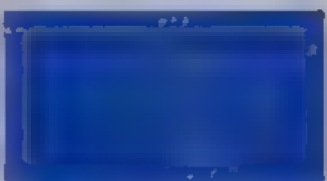


Figure 2

$$\frac{1}{x^2} = x^{-2}$$

$$\frac{1}{x^2} = x^{-2}$$

$$\frac{1}{x^2} = x^{-2}$$

$$\frac{1}{x^2} = x^{-2}$$

Math 101

$$\frac{1}{x^2} = x^{-2}$$

$$\frac{d}{dx} x^{-2} = -2x^{-3}$$

$$= -\frac{2}{x^3}$$

Math 101

$$\frac{d}{dx} \frac{1}{x^2} = -\frac{2}{x^3}$$

Math 101

$$\frac{1}{x^2} = x^{-2}$$

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 $\frac{1}{16} \times \frac{1}{16} = \frac{1}{256}$
 $\frac{1}{256} \times \frac{1}{256} = \frac{1}{65536}$



$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$
 $\frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$
 $\frac{1}{16} \times \frac{1}{16} = \frac{1}{256}$
 $\frac{1}{256} \times \frac{1}{256} = \frac{1}{65536}$

$$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

$$f \mapsto_{\text{na}} \left(\frac{dx}{dt} = f(x) \right) \frac{dx}{dt} = f$$

$$y = \frac{a + b}{c + \frac{d}{e + f}} + g$$

$$y = \frac{a + b}{c + \frac{d}{e + \frac{a + b}{c + \frac{d}{e + \frac{a + b}{c + \frac{d}{e + \frac{a + b}{c + \frac{d}{e + f}}}}}}}} + g$$

Friday, July 1, 1944

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Problem Set 9.1

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Problem Set 9.1

$$1. \frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$$

$$2. \frac{1}{4} + \frac{1}{5} = \frac{5}{20} + \frac{4}{20} = \frac{9}{20}$$

$$3. \frac{1}{6} + \frac{1}{8} = \frac{4}{24} + \frac{3}{24} = \frac{7}{24}$$

$$4. \frac{1}{10} + \frac{1}{12} = \frac{6}{60} + \frac{5}{60} = \frac{11}{60}$$

$$5. \frac{1}{15} + \frac{1}{20} = \frac{4}{60} + \frac{3}{60} = \frac{7}{60}$$

$$6. \frac{1}{25} + \frac{1}{30} = \frac{6}{150} + \frac{5}{150} = \frac{11}{150}$$

$$7. \frac{1}{35} + \frac{1}{40} = \frac{8}{280} + \frac{7}{280} = \frac{15}{280} = \frac{3}{56}$$

$$8. \frac{1}{45} + \frac{1}{50} = \frac{10}{450} + \frac{9}{450} = \frac{19}{450}$$

$$9. \frac{1}{55} + \frac{1}{60} = \frac{12}{660} + \frac{11}{660} = \frac{23}{660}$$

$$10. \frac{1}{65} + \frac{1}{70} = \frac{14}{910} + \frac{13}{910} = \frac{27}{910}$$

$$11. \frac{1}{75} + \frac{1}{80} = \frac{16}{1200} + \frac{15}{1200} = \frac{31}{1200}$$

$$12. \frac{1}{85} + \frac{1}{90} = \frac{18}{1530} + \frac{17}{1530} = \frac{35}{1530} = \frac{7}{306}$$

$$13. \frac{1}{95} + \frac{1}{100} = \frac{20}{1900} + \frac{19}{1900} = \frac{39}{1900}$$

$$14. \frac{1}{105} + \frac{1}{110} = \frac{22}{2310} + \frac{21}{2310} = \frac{43}{2310}$$

$$15. \frac{1}{115} + \frac{1}{120} = \frac{24}{2760} + \frac{23}{2760} = \frac{47}{2760}$$

$$16. \frac{1}{125} + \frac{1}{130} = \frac{26}{3250} + \frac{25}{3250} = \frac{51}{3250}$$

Winterfest



Mathematics as a Programming Language

[The page contains approximately 18 lines of extremely faint, illegible handwriting.]

U. 47.44

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void IHBMMWMM(void)
{
     $\gamma' = \gamma \cdot \sqrt{1 + I_2}$  ;
     $\psi = \gamma + \gamma_1 + \beta \Delta$  ;
     $\alpha_{em} = \alpha_0 \cdot \frac{1 + (\gamma' \cdot \gamma \cdot I_2 \cdot \beta')}{\gamma' + \psi}$  ;
    if (! $\gamma_1$  || fabs( $\Delta \cdot T_1$ ) < 0.01)
         $\alpha_{em} = 4.5 \cdot \alpha_0 \cdot I_2 \cdot \text{pow}(\gamma/\gamma', 3)$  ;
    else
    {
         $\beta' = 1/T_1 + \gamma_1$  ;
         $I_2 \cdot \beta' = \frac{I_2/T_1}{1 + \beta \Delta}$  ;
         $\beta = \sqrt{\beta'^2 - \psi \cdot (\psi + \gamma \cdot I_2 \cdot \beta')}$  ;
         $\alpha_{em} = 5 \cdot \gamma \cdot \alpha_0 \cdot \frac{I_2 \cdot \beta' (\gamma + \psi)}{\gamma' \cdot \gamma' + \beta'^2} \cdot \left( \left( 1 + \frac{\gamma}{\beta} \right) \cdot \frac{\beta' + \psi}{\beta + \psi} + \left( 1 - \frac{\gamma}{\gamma'} \right) \cdot \frac{\gamma' + \psi}{\gamma' + \psi} \right)$  ;
    }
     $\alpha_2 = \alpha_{em} + \alpha_{em}$  ;
}

```

References

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- B. Beeton, A. Freytag, M. Sargent III, *Unicode support for mathematics*, <http://www.unicode.org/reports/tr25/> (2003)
- D. E. Knuth, *The TeXbook*, Addison Wesley (1986)
- L. Lamport, *LaTeX*, Addison Wesley (1994)
- MathML 2.0 is documented at <http://www.w3.org/Math/> (2003)

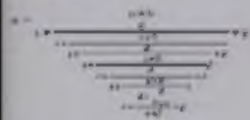
Conclusions

- 8 infrastructures allow us to do math display and editing better than ever
- High quality LineServices math handler enables better typography than TeX
- Streamlined input methods facilitate math entry
- Incorporate into Word 12, OneNote 2.0, RichEdit, PowerPoint, IE, ... and maybe future compilers



Address [http://www.math.com](#)

$$A = \left(\frac{x + y}{x + y + z} \right)$$



$$\begin{pmatrix} x + y & z \\ x & y + z \end{pmatrix}$$

$$\begin{pmatrix} x + y & z \\ x & y + z \end{pmatrix} \begin{pmatrix} x + y & z \\ x & y + z \end{pmatrix}$$

$$x = \int_0^1 dx \frac{x}{x + y}$$